

Dynamic simulation of solid oxide fuel cell based auxiliary power unit with respect to uncertainty of diesel fuel

김대욱, 이재형^{1,†}

한국과학기술원; ¹한국화학기술원

(jayhlee@kaist.ac.kr[†])

Solid Oxide Fuel Cell (SOFC) based auxiliary power unit (APU) system using diesel fuel is expected to be an eco-friendly and efficient alternative to supply non-propulsion power for heavy-duty truck instead of idling. In the system, diesel used as fuel consists of hundreds of different components and the composition varies depending on the nature of crude oil and refinery process. In addition, it is almost impossible to know accurately the composition change of the diesel fuel during the actual operation of the system. Thus, in this study, dynamic model of the overall SOFC-APU system was constructed including the detailed models for auto-thermal reformer and SOFC stack as main components of the system. And then, it was studied how the composition change of the diesel fuel affects the overall system by changing carbon number of the fuel entered into the system through the dynamic simulation using the constructed model.